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$$\therefore\ r=\frac{abc\left\{ab+ac+bc\pm2\sqrt{abc(a+b+c)}\right\}}{4abc(a+b+c)-(ab+ac+bc)^2}=\frac{\left\{863\pm102\sqrt{95}\right\}4845}{243611};$$

$\therefore\ r=36.93595$ or -2.608803.

The first value is the radius of circumscribing circle, the second is the radius of the circle inscribed in the space enclosed by the three circles.

PROBLEMS.

50. **Proposed by B. F. FINKEL, A. M., Professor of Mathematics and Physics in Drury College, Springfield, Missouri.**

Draw a line perpendicular to the base of a triangle dividing the triangle in the ratio of m to n.

51. **Proposed by G. B. M. ZERR, A. M., Ph. D., Vice President and Professor of Mathematics in the Texarkana College, Texarkana, Arkansas.**

To construct a trapezoid; given the bases, the perpendicular distance between the bases and the angle formed by the diagonals.

◆

CALCULUS.

Conducted by J. M. COLAW, Monterey, Va. All contributions to this department should be sent to him

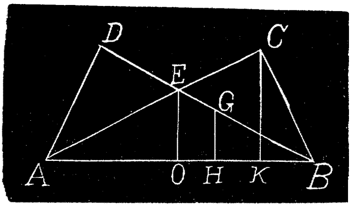
SOLUTIONS OF PROBLEMS.

36. **Proposed by H. C. WHITAKER, B. Sc., M. E., Professor of Mathematics, Manual Training School, Philadelphia, Pennsylvania.**

A cube is revolved on its diagonal as an axis. Define the figure described and calculate its volume.

Solution by G. B. M. ZERR, A. M., Ph. D., Vice President and Professor of Mathematics in the Texarkana College, Texarkana, Arkansas.

The surface of the solid is that generated by revolving $ADECB$ about AB as an axis.



Let $AD=BC=a$ be the side of the cube. Then $AC=BD=a\sqrt{2}$, $AB=a\sqrt{3}$, $OC=\dfrac{a\sqrt{3}}{2}$. $AC^2=AB.AK$. $\therefore\ AK=\dfrac{2a}{\sqrt{3}}$. $CK^2=AK.BK=AK(AB-AK)$.

$$\therefore\ CK=\frac{a\sqrt{2}}{\sqrt{3}}.$$

$$GH=\tfrac{1}{3}CK=\frac{a\sqrt{2}}{3\sqrt{3}}.\quad EO:AO=CK:AK.\quad \therefore\ EO=\frac{a\sqrt{6}}{4}.$$